

CLAIMS

What is claimed is:

[c1] 1. A coupling device for a shaft, comprising: a coupling disk (1) associated with an out-extending shaft (8); a disk (2) connected with an external force member (7); a first concave-convex assembly (4) which is press engaged with said disk (2); a second concave-convex assembly (5) which is engaged with said coupling disk (1); a force generating source member (3) provided between said coupling disk (1) and said disk (2), characterized in that:

said first and second concave-convex assemblies (4, 5) are configured to be a press engagement arrangement in which rotational angular displacement and axial displacement relative to each other is operable;

said first concave-convex assembly (4) and said disk (2) are configured to be an axial press engagement arrangement in which rotational sliding angular displacement between said first concave-convex assembly (4) and said disk (2) relative to each other is operable;

an external force association member (6) is provided between said concave-convex assembly (4) and an external force member (7), and said external force association member (6) and said concave-convex assembly (4) are configured to be a radial press engagement arrangement in which an axial sliding displacement between said external force association member (6) and said concave-convex assembly (4) relative to each other is operable;

said concave-convex assembly (5) is mounted on said coupling disk (1),
and two ends of said force generating source member (3) are
connected with said coupling disk (1) and said disk (2);
upon action of said force generating source member (3), said disk (2) is
associated with said out-extending shaft (8) through said
coupling disk (1) so that said external force member (7) and said
out-extending shaft (8) are associated.

[c2] 2. The coupling device for a shaft according to claim 1, further
comprising:

a friction block (20) provided between said coupling disk (1) and said
coupling disk (2); and

a retaining member (21) which is coupled with said friction block (20),
wherein:

friction surfaces respectively extending from said coupling disk (1) and
said disk (2) engage with said friction block (20).

[c3] 3. The coupling device for a shaft according to claim 2, wherein:
said friction surfaces include an inner disk body (23) and an outer
friction ring (24), wherein:

said inner disk body (23) and said outer friction ring (24) are provided
therein with an outer threaded block (27), a compensation spring
(28) and a key pin (36).

[c4] 4. The coupling device for a shaft according to claim 1, wherein:
said first and second concave-convex assemblies (4, 5) are supported
on a left end plate (54) and a right end plate (56) of said
retaining member (21) through bearings (52'), respectively.

- [c5] 5. The coupling device for a shaft according to claim 4, wherein:
said second concave-convex assembly (5) is provided with an inner
brake ring (53).
- [c6] 6. The coupling device for a shaft according to claim 1, wherein:
said first and second concave-convex assemblies are provided with an
insert rod (38) and insert slot which correspond to each other so
as to be locked with each other, and said insert rod (38) is
mounted inside an outer threaded sleeve (84) of a
release-ensuring frame (41);
one end of a release-ensuring spring (40) is connected with a plug (85)
of said insert rod (38), and the other end of said
release-ensuring spring (40) is connected with a cap (45);
inner threads of said cap (45) are connected with said outer threaded
sleeve (84), and said insert rod (38) passes through a hole of
said cap (45) so as to be connected with a centrifugal cap (44).
- [c7] 7. The coupling device for a shaft according to claim 1, wherein:
said coupling disk (1) is assembled to said out-extending shaft through
a shaft coupling member (9).
- [c8] 8. The coupling device for a shaft according to claim 1, wherein:
said first concave-convex assembly (4) and said external force
association member (6) are configured to be engaged with each
other through an outer spline and an inner spline.
- [c9] 9. The coupling device for a shaft according to claim 1, wherein:
said force generating source member (3) comprises a press spring (3').

- [c10] 10. The coupling device for a shaft according to claim 1, wherein:
a friction member (18) is provided between said first concave-convex assembly (4) and said external force association member (6);
and
said friction member (18) engages with said first concave-convex assembly (4) and said external force association member (6), respectively.
- [c11] 11. The coupling device for a shaft according to claim 10, wherein:
said friction transmission member (19) is provided between said first concave-convex assembly (4) and said friction member (18);
and
said friction transmission member (19) engages with said first concave-convex assembly (4) and said friction member (18) respectively.
- [c12] 12. The coupling device for a shaft according to claim 1, wherein:
said first and second concave-convex assemblies (4,5) include engaging surfaces of right-handed helicoids which are engaged with each other.
- [c13] 13. The coupling device for a shaft according to claim 1, wherein:
said disk (2) includes a release-ensuring frame (41) projected from therefrom;
said first concave-convex assembly (4) includes a cylindrical sleeve (70) which is fitted over thereon; and
a locking member (a) is fixedly engaged with said release-ensuring frame (41) and said cylindrical sleeve (70) so that relative rotational movement between said first and second concave-convex assemblies (4, 5) is locked.

- [c14] 14. The coupling device for a shaft according to claim 8, wherein:
said first concave-convex assembly (4) is provided with an inner spline
(15) so as to engage with an outer spline (16) provided on said
second concave-convex assembly (5).
- [c15] 15. The coupling device for a shaft according to claim 3, wherein:
said outer friction ring (24) engages with a right friction ring (35)
through said key pin (36), and said right friction ring (35) is
associated with said friction ring (20).
- [c16] 16. The coupling device for a shaft according to claim 1, wherein:
a pull rod (14) is mounted on said coupling disk (1) and passes through
a circular hole of said disk (2) so as to be associated with said
disk (2).
- [c17] 17. The coupling device for a shaft according to claim 9, wherein:
a pull rod (14) is mounted on said coupling disk (1) and passes through
a circular hole of said disk (2) so as to be associated with said
disk (2).
- [c18] 18. The coupling device for a shaft according to claim 17, wherein:
said press spring (3') is fitted over said pull rod (14), wherein:
one end of said press spring (3') is pressed against and
mounted on said disk (2), and the other end of said press
spring (3') is mounted on said pull rod (14).
- [c19] 19. The coupling device for a shaft according to claim 2, wherein:
said retaining member (21) is mounted on a relatively movable object
so as to achieve a coupling clutch function.

- [c20] 20. The coupling device for a shaft according to claim 2, wherein:
said retaining member (21) is mounted on a relatively static object so
as to achieve a coupling brake function.